RES17-06

M E M O R A N D U M

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SUBJECT: Changes in Assumptions SFWMMv3.5 to SFWMMv3.7

The purposes of this write-up are: 1) to list the changes in the assumptions from SFWMMv3.5 to SFWMMv3.7, and 2) to analyze the differences in the results of the simulations of the 95Base and the 2050Base between version 3.5 of SFWMM, the version used for the Restudy, and the working version of SFWMMv3.7 The differences between the 95Base simulations will be discussed first, then the 2050Base simulations.

CHANGES IN ASSUMPTIONS FROM SFWMMv3.5 TO SFWMMv3.7

The assumptions included in SFWMMv3.7 that are not included in or modified from SFWMMv3.5 are as follows:

95BASE

1. Delivery of Makeup water from Lake Okeechobee to WCAs is subject to constraints due to high water in WCAs. When stages in WCA-1 are above the current schedule (15.5-17.5 ft NGVD), makeup water is not delivered to WCA-1. When stages in WCA-2A are above the current drawdown schedule (11.0-13.0 ft NGVD), makeup water is not delivered to WCA2A. When stages in WCA-3A are in Zone A of the regulation schedule, makeup water is not delivered to WCA-3A. The high water constraint is consistent with current operations and was incorporated in the most recent analysis of the WSE schedule for LOK and made part of the 95BASE.

2. Estimates of the L-31W stage targets for the Taylor Slough rainfall plan have been updated. They are little lower than in V3.5.

3. The maximum discharge through S-174 into L-31W is limited to 500 cfs. In V3.5 the maximum capacity was only constrained by headwater and tailwater; flows approached 1000 cfs at times. Flows of this magnitude never occurred historically.

4. Further constraints are imposed on regulatory discharges from LOK to WCAs to reflect current operations in the following way:

If stages in WCA-1 OR any other WCA are higher than 0.25 feet above the MAXIMUM of respective schedules, then regulatory releases to WCA-1 from LOK are stopped. If stages in WCA-2A OR WCA-3A are higher than 0.25 feet above the MAXIMUM of respective schedules, then regulatory releases to WCA-2A are stopped.

5. Tailwater constraints due to stages at G3273 location for S-333 flows to NESRS have been relaxed. The constraint in the SFWMM has been elevated from 6.8-7.0 ft. NGVD to 7.15 ft NGVD at the G3273 location so the temporal distribution of simulated flows through S-333 (particularly at times when S-333 flows were cut off) better match what occurred during 1985-1995 period. In V3.5 the constraint was set between 6.8 and 7.0 ft NGVD which matches actual operations; however, the 4 sq. mile representation of stages at G3273 in SFWMM is about 0.25 feet higher than what actually occurred AT the G3273 gage. Thus an adjustment in the tailwater constraint as seen by the SFWMM at G3273 for flows to NESRS is necessary.

2050 BASE

1. Tailwater constraints due to stages at G3273 location for S-333 flows to NESRS have been refined as in the 95BASE. S-355 discharges are subject to stage constraints at G3273 gage location, as well as in L-29 borrow canal.

2. STA-2 bypass is only routed through S6 structure that is also used to route appropriate volumes into STA-2. This is consistent with the design. In V3.5 it was assumed a separate bypass structure is proposed which resulted in ~20,000 acre ft/year of EAA runoff bypassing STA-2 into WCA-2A. In V3.7 STA2 bypass is nearly zero.

COMMON to 95BASE and (or 2020 BASE in LEC Plan)

1. Rating for discharge through G97 (Coral Gables Canal) has been significantly reduced. Rating was too high for structure. This will result in a slight redistribution of flows to Central Biscayne Bay and via S-25B and S-25 to Miami River.

2. The estimates for S236 basin demand/runoff and S4 basin demand have been modified since the area in EAA used (irrigated areas in Miami canal basin in V3.5) as a basis for estimates has been changed to make it consistent between alternatives. In V3.5 the area could change significantly depending on the EAA storage simulated in the alternative. Thus the area used for estimates in V3.7 is the northern part (north of Row 50 in SFWMM) of Miami and NNR-HILL canal basins. This area is not affected directly in any of the currently proposed

alternatives, and as a result there is much greater consistency among alternatives in the estimates of S236 runoff/demand and S4 demand. Runoff was of greater concern. Modified Delta Storage for LOK also had to be recomputed for consistency, since the simulated values of S236 runoff/demand and S4 demand from the 95 BASE were used in the computation of MDS.

3. In V3.7 S12A, S12B, S12C, S12D can be simulated separately where in V3.5 only, the total flow for the S12 structures could be simulated. Simulating the S12s separately as opposed to simulating the total has negligible impact on the results; however, we have much greater flexibility, and as a result can better investigate various alternatives for operation of the S-12s.

4. Simulation of stages in the L30 borrow canal and C304 have been refined so that occasional oscillations in daily stages have been minimized. Seepage rates from WCA-3B to LEC were affected slightly.

5. It was recently found that the USGS stage data at PB445 in Central Palm Beach County during the calibration/verification period (1979-1995) are 1.35 feet too high compared to what actually occurred due to incorrect benchmark. Thus, the simulated head drop along E-2 in LWDD was reduced 1.5 feet to ~1.0 ft) in V3.7.

Note: In SFWMMV3.7 the Decision Tree for the WSE Operational schedule for LOK can be simulated.

COMPARISON OF RESULTS OF 95BASEV3.5 WITH 95BASEV3.7

LAKE OKEECHOBEE

The total annual average deliveries of BMP Makeup water to the WCAs decreased 23 kac-ft from V3.5 to V3.7. The volumes were redistributed as shown in table below:

Table 1: Average Annual Deliveries of Makeup Water from LOK to WCAs (1000 acre-ft)

	95BaseV3.5	95BASEV3.7	Difference (V3.7 minus V3.5)
To WCA-1	52	34	-18
To WCA-2A	49	7	-42
To WCA-3A	64	101	+37
TOTAL	**165**	**142**	**-23**

The above changes in deliveries of BMP Makeup water is a result of the additional constraints imposed in V3.7 on the makeup water deliveries due to high water in WCAs. The additional constraints have been presented in a previous section of the write-up. Keep in mind the makeup water deliveries occur during the months October - February. The change in operation of BMP Makeup water deliveries incorporated in V3.7 reflects change in actual operations as a result of the extreme high water in WCAs experienced in Fall 1994 and Spring 1995.

Note that the portion of the Makeup water target not met is carried over to the next day and can accumulate until the end of the month. No carryover occurs from month to month OR from one WCA to another within a time step. Thus the redistribution of the delivery of makeup water from V3.5 to V3.7.

The impacts of the changes in the delivery of BMP Makeup water described above on Lake Okeechobee are the following:

1) an increase in LOK stages in V3.7 (as seen in Figure 1 or Figure 2 when WCAs are above schedule. An example of an increase in LOK stages of up to 0.25 feet is during fall 1994 and spring 1995 when stages in all the WCAs are sufficiently high to completely negate BMP Makeup water deliveries for a period of time. Figure 3 shows that the number of undesirable stage events increases from 6 to 9, all on the high end.

2) more regulatory releases from LOK (an additional 21kac-ft/year) as a result of increased stages, as shown in the table below:

Table 2. Average Annual Volumes of Regulatory Releases from LOK (1000 acre-ft)

To WCA – 1	47	44

To WCA – To WCA – 3A	10 5	10 5
TOTAL TO WCAs	**62**	**59**
To Caloos Estuary To St. Lucie Estuary	288 126	303 135
TOTAL TO ESTUARIES	**414**	**438**
TOTAL REG REL	***476***	***497***

The decrease in regulatory releases to WCAs in V3.7 is due to further constraints as discussed earlier, on regulatory releases to WCAs from LOK.:

As in V3.5 regulatory releases to WCA-3A are discontinued when stages in WCA-3A are higher than 0.25 feet above the MAXIMUM of Zone A line of regulation schedule. Thus the additional constraints on regulatory discharges and BMP Makeup water deliveries from LOK to WCAs contribute to the increase (24 kac-ft/year) in regulatory discharges to Caloosahatchee and St. Lucie estuaries. The impacts of increased regulatory discharges to Caloosahatchee and St. Lucie estuaries are minimal. The number of times mean monthly flow to Caloosahatchee estuary is greater than 2800 cfs decreases from 70 to 69, but the number of times the mean monthly flow is greater than 4500 cfs increases from 29 to 31(Figure 4). The number of times the mean monthly flow to St. Lucie estuary exceeds 1600 cfs increases from 76 to 78 and 2500 cfs from 40 to 41(Figure 5). Note that approximately 80% of the total increase in regulatory releases to tidewater from LOK over the 31-year simulation occurs in fall 1994 and spring 1995 when the stages in WCAs are so high that water from LOK would no longer be routed south with the new constraints incorporated in V3.7.

WATER CONSERVATION AREAS

The impact of the redistribution of BMP Makeup water can readily be seen in the flows through the WCAs, as seen in Table 3 below.

Table 3: Average Annual Flows Through the WCAs (1000 acre-ft)

	95BASE V3.5	95BASE V3.7	Change in Makeup Water Deliveries (V3.7 minus V3.5) from Table 1
WCA-1 Inflow Outflow to WCA-2A	562 448	540 428	-18 (S-10s, S-10 E)
WCA-2A Inflow Outflow to WCA-3A Outflow to WCA-2B	735 587 93	673 528 88	-42 to WCA-2A (total is -60 for WCA-1 and 2A)
WCA-3A Inflow from WCA-2A Inflow from EAA/LOK	587 391	528 428	+37 to wCA-3A from LOK
TOTAL	**978**	**956**	
TOTAL FROM STRUCT	***1454***	***1433***	

It can be seen from the above table that the change in flows through the WCAs is the result of redistribution of Makeup water from LOK.

The increase (37 kac-ft/year) in Makeup water deliveries from LOK through S8 slightly increases stages (~0.1 ft) in northern WCA-3A, as seen in Figures 6 and 7. Figure 8 shows the hydroperiod matching with NSM45 increases from 42% to 50% in WCA-3A north of Alligator Alley in response to the increased flows through S8. S340, which is open mainly for water supply purposes to LECSA3, is closed during the times when BMP Makeup water is delivered. The stages in WCA-2A decreases slightly (Figure 9), but not enough to affect hydroperiod (Figure 10) since the net inflow into WCA-2A (Inflow - Outflow) does not change appreciably. The same is true for WCA-1 (Figures 11 and 12). Stages at 2B-21 (Figure 13) in WCA-2B decrease slightly (up to 0.3 - 0.4 ft) from V3.5 to V3.7 due to the reduction of inflows from WCA-2A (up to 10 kac-ft in a year) through S-144, S-145, and S-146.

Figures 14 (Gage 3B-29) and 15 (Gage 3B-SE) show that the stages in eastern WCA-3B decrease from 0.1 ft to 0.4 ft in V3.7 compared to V3.5 during the transition from wet periods to drier periods. Simulation of stages in the L30 borrow canal and C304 have been refined so that occasional oscillations in daily stages have been minimized in V3.7. The reduction in
oscillation results in an increase from V3.5 to V3.7 of up to 25 -30 kac-ft of seepage in a year from WCA-3B to LEC which in turn lowers stages at times in

eastern WCA-3B. The effects of the increased seepage in V3.7 to LEC on western (Figure 16) and northern WCA-3B (Figure 17) in 95BASE are negligible. The hydroperiod matching in WCA-3B with NSMv45 decreases from 59.3% in V3.5 to 55.6% in V3.7.

WATER SUPPLY PERFORMANCE

Lake Okeechobee Service Area

The percentage of demand not met for the EAA and the other service areas do not change, as seen in Figures 18 and 19. It is important to note that the difference in demand not met in the EAA depicted in the graphics is a result of a bug in the accounting of demand met in EAA in V3.5 that is corrected in V3.7. A rerun of V3.5 would be necessary (no change in model results would occur) to correct the accounting. The percentages should be the same for the EAA (~16% demand not met on average annual basis).

Lower East Coast Service Areas

Regional water supply deliveries to LEC Service areas change slightly. Regional water supply deliveries to LECSA1, that excludes LOK water supply releases to L8/M-canal in the PM graphic (Figure 20), decreases from 45 kac-ft/year in V3.5 to 39k ac-ft/year in V3.7. This is due to the decrease (~1.0 ft) in stages maintained in the Deerfield Agricultural District in Northern Broward county west of Deerfield Beach and the 1.5 ft. decrease in simulated head drop along E-2 in LWDD in V3.7. The stages maintained in V3.7 in Deerfield Agricultural District reflect what was done in the 1991 -95 period when significant development occurred. The stages maintained in V3.5 reflects the operation prior to 1989 when the canals in this area were maintained higher for agricultural purposes. Due to the lower operating levels the demand on the regional system in maintaining E-2 in LWDD, Hillsboro Canal and the local canals in Northern Broward County decreased slightly.

Regional water supply deliveries to LECSA2 increases slightly from 10 kac-ft/year to 12 kac-ft / year for 31-year simulation (28 kac-ft/year to 32 kac-ft/year during drought years). This is due to the slight decrease in stages in WCA-2A and WCA-2B as a result of the BMP Makeup water redistribution translating to an average of 2 kac-ft decrease (V3.5 to V3.7) in seepage from WCA-2 system to LECSA2 (see Figure 21). The decrease in seepage from V3.5 to V3.7 increases the need for surface water deliveries from the storage areas in V3.7.

The change in regional water supply deliveries to LECSA3 is negligible. The total number of months of water supply restrictions in the LEC service areas does not change (Figure 22).

FLOWS TO EVERGLADES NATIONAL PARK

The total surface water flow across the trail decreases from 718 kac-ft/year in V3.5 to 690 kac-ft/year in V3.7 (Figure 23) as a result of the change in operation of the S-12 structures and the increased seepage losses (from the eastern grid cell along Tamiami Trail to the LEC. The total discharges through S12s and S333 decrease from 780 kac-ft/year in V3.5 to 758 kac-ft/year in V3.7. In V3.5 the S-12s always attempt to meet 45% of the flow target plus all that S333 does not meet. In V3.7 S12s attempt to meet 45% of the flow target plus all that S333 does not meet as long as stages in WCA-3A are above the upper transition zone (Zone C) or in the lower transition zone (Zone D) in the dry season and above Zone E in the wet season; otherwise the S12s meet 45% of the flow target regardless of S333's ability to meet its target, which is 55% of the total flow target. The operation of S12s in V3.7 is more consistent with the intent of the WCA-3A operational schedule and the desires of ENP. This change in operation of the S12s reduces the flows through S-12s approximately 20 kac-ft/year from V3.5 to V3.7.

The surface water flows across Tamiami Trail have been redistributed in V3.7 as compared to V3.5. The west-east split has changed from 600 kac-ft/year (84%)/ 118 kac-ft/year (16%) in V3.5 to 553 kac_ft/year(80%)/ 139 kac-ft/year(20%) in V3.7(Figure 23). The increased flows (~50 kac-ft.year) through S-333 from V3.5 to V3.7 into NESRS contributes to the redistribution of flows across Tamiami Trail. The tailwater constraints at G3273 location for S333 flows have been relaxed as discussed earlier.

As a result of the redistribution of flows into ENP stages in NESRS (Figure 24) increase slightly (~ 0.1 feet) while stages in the western portion of Shark River Slough decrease (Figure 25) in V3.7 compared to V3.5. Hydroperiod matches (Figure 26) with NSMv45 decrease slightly(from 55.8% in V3.5 to 54.7% in V3.7). Seepage losses from ENP to LEC increase from 286 kac-ft/year in V3.5 to 313 kac-ft/year (Figure 21) in V3.7 (28 kac-ft/year increase) as a result of the 50 kac-ft/year increase in S333 flows to NESRS.

FLOWS TO BISCAYNE BAY

Figure 27 shows the comparison of flows to Biscayne Bay. The findings are the following:

1. The flows to Central Bay and Miami River are redistributed. Rating for discharge through G97 (Coral Gables Canal) has been significantly reduced in V3.7. Rating is too high for structure in V3.5. As a result of the reduction of flows through G97, flows to Miami River increase from 192 kac-ft/year in V3.5 to 207 kac-ft/year in V3.7. The 15 kac-ft/year increase is through S-25B and S-25.

Correspondingly the flows to Central Bay decreases about 15 kac-ft/year due to the reduction in flows through G97.

2. Flows through S197, increase 6 kac-ft /year from V3.5 to V3.7. This is due to the decrease (25kac-ft/year) in flow through S174 contributed by a) the maximum discharge being limited to 500cfs in V3.7 instead of discharge capacity being solely constrained by HW and TW where flows approached 1000 cfs at times which never actually occurred, and b) estimates of the L31W stage targets for Taylor Slough rainfall plan have decreased slightly from V3.5 to V3.7. Decreased flow through S-174 for flood control purposes (not environmental) results in more flow via C-111 to tide in V3.7.

3. The increase in seepage from ENP (28 kac-ft/year) results in about 10 kac-ft/year increase in flow to Central Bay that compensates for most of the decrease described in 1). The net result seen in Figure 27 is a 4 kac-ft/year decrease (225 to 221) from V3.5 to V3.7 in flows to Central Biscayne Bay. Moreover, the increase in seepage from ENP as well as the decrease in S-74 flows contribute to an increase of flows from 210 kac-ft/year in V3.5 to 221 kac-ft/year in V3.7 to South Biscayne Bay.

COMPARISON OF 50BASEV3.5 WITH 50BASEV3.7

LAKE OKEECHOBEE

The impacts of changes from V3.5 to V3.7 on LOK are considerably less than in the 95 Base condition. In the 2050 Base rain driven targets are used in determining environmental water supply releases from LOK to WCAs and in determining high water constraints imposed on regulatory releases from LOK to WCAs. The environmental water supply deliveries from LOK to WCAs average approximately 160 kac-ft /year in V3.5 and V3.7 using all the available conveyance in EAA canals in both simulations.

The impacts on changes from V3.5 to V3.7 on LOK are the following:

1) A slight increase in regulatory releases from LOK as shown below:

Table 4. Regulatory Releases from LOK (1,000 acre-ft)

WCA	50 BASE V3.5	50 BASE V3.7
To WCA-3A		
Miami Canal	64	65
NNRC	46	41
To WCA-2A		
Via HILL Canal	0	0
To WCA-1	0	0
TOTAL TO WCAs	110	106
To Caloos Estuary	206	211
To St. Lucie Estuary	88	90
TOTAL TO TIDE	**294**	**301**
TOTAL REGUL	***404***	***408***

The slight increase (4 kac-ft/year) in regulatory releases from V3.5 to V3.7 is due to the increase (10 kac-ft/year) in flood control backpumping through S2 from NNR-HILL canal basins in EAA. The STA-2 bypass, averaging 22 kac-ft/year, is overestimated in V3.5. The bypass structure is assumed to be in parallel with S-6 in V3.5, but the latest design of STA-2 has the bypass structure in series so that S6 capacity is the limit to removing water from the NNR_HILL canal basin. As a result STA-2 bypass in V3.7 is nearly zero, which is consistent with the intent of the design. The untreated water that bypassed STA-2 in V3.5 remains in EAA in V3.7 and has to be removed some other way. An average of 10 kac-ft/year of the additional 22 kac-ft/year of excess water in NNR-HILL canal basin in EAA in V3.7 is backpumped for flood control purposes into LOK. The impact of the additional backpumping into LOK on LOK stages is negligible, as seen in figures 1 and 2. The impacts of increased regulatory discharges from

V3.5 to V3.7 to Caloosahatchee and St. Lucie estuaries are negligible, less than in the 95Base (see Figures 4 and 5).

WATER CONSERVATION AREAS

The impact of the reduction (22 kac-ft/year) of STA-2 bypass into WCA-2A from V3.5 to V3.7 can readily be seen in the flows through WCA-2A,as seen in Table 5 below.

Table 5: Average Annual Flows Through the WCAs (1000 acre-ft)

	2050BASEv3.5	2050BASEv3.7
WCA-2A		
Inflow from WCA-1	197	198
Inflow from LOK/EAA	303	288 (includes STA-2 Bypass, if any)
TOTAL Inflows	**500**	**486**
Outflow to WCA-3A	292	276
Outflow to WCA-2B	130	128
TOTAL Outflows	**422**	**403**
WCA-3A		
Inflow from WCA-2A	292	276
Inflow from STA3&4	645	650
TOTAL Inflows (includes all sources)	**1503**	**1492**

The reduction of STA-2 bypass water into WCA-2A in V3.7 is partially offset by the diversion of some of the additional (as a result of reduction in STA-2 bypass) excess NNR-HILL canal basin water into STA-2 when capacity is available, which eventually ends up in WCA-2A as treated water. Thus the total inflow into WCA-2A is only reduced 14 kac-ft/year in V3.7 compared to V3.5 instead of 22 kac-ft/year, the magnitude of reduction of STA-2 bypass. Similarly, some (~ 5 kac-ft/year) of the additional excess water in NNR-HILL canal basin in V3.7 is also diverted to STA-3&4 which eventually ends up in WCA-3A as treated water. The increase of treated water into WCA-3A via STA3&4 in V3.7 partially offsets the reduction of inflow into WCA-3A from WCA-2A, as shown in the table above. Changes in stages in WCA-3A (see Figures 6 and 7) and WCA-2A (Figure 9) between V3.5 and V3.7 are negligible. Stages at 2B-21 (Figure 13) in WCA-2B decrease slightly (up to 0.1 -0.2 ft) from V3.5 to V3.7 due to the reduction of inflows from WCA-2A (up to 6-7 kac ft in a year) through S-144, S-145,and S-146.

Similar to the 95 BASE, figures 14 (Gage 3B-29) and 15 (Gage 3B-SE) show that the stages in eastern WCA-3B decrease from 0.1 ft to 0.5 ft. in V3.7 compared to V3.5 during the transition from wet periods to drier periods. Simulation of stages in L30 borrow canal and C304 have been refined so that occasional oscillations in daily stages have been minimized in
V3.7. The reduction in oscillations results in an increase from V3.5 to V3.7 of up to 25 -30 kac-ft of seepage in a year from WCA-3B to LEC that in turn lowers stages at times in eastern WCA-3B. An additional 8 kac-ft /year flows into ENP via S12s and S333 from WCA-3A (discuss later) which results in a similar reduction of flows from WCA-3A to WCA-3B via S151 and S345. The reduction in flows through S345 and S151 also contributes to the reduction in stages in WCA-3B. The reduction in stages is evident in western (Figure 16) and northern (Figure 17) parts of WCA-3B. The hydroperiod matching in WCA-3B with NSMv45 decreases from 55.6% in V3.5 to 48.1% in V3.7.

FLOWS TO EVERGLADES NATIONAL PARK

The surface water flows across Tamiami Trail have been redistributed in V3.7 as compared to V3.5 for the same reason as explained for 95BASE. The west-east split has changed from 775 kac-ft/year (89%)/ 94 kac-ft/year (11%) in V3.5 to 714 kac_ft/year(84%)/ 138 kac-ft/year (16%) in V3.7 (Figure 23) . The increase in flows (75 kac-ft.year) through S-333 from V3.5 to V3.7 into NESRS contributes to the redistribution of surface water flows across Tamiami Trail. Even though the total structural flows into ENP via S12s, S333, and S355 increase from 960 kac-ft/year in V3.5 to 967 kac-ft/year in V3.7, the total surface flows across Tamiami Trail decreases slightly from 869 kac-ft/year in V3.5 to 852 kac-ft/year in V3.7 This is due to 1) decrease of 10 kac-ft/year (56 to 46 kac-ft/year) from V3.5 to V3.7 in seepage into NESRS from WCA-3B, and 2) increase in seepage from eastern cell along Tamiami Trail to LEC.

As a result of the redistribution of flows into ENP stages in NESRS (Figure 24) increase slightly (~ 0.1-0.2 feet) while stages in the western portion of Shark River Slough decrease (Figure 25) in V3.7 compared to V3.5. Hydroperiod matches (Figure 26) with NSMv45 decrease slightly (from 71.6% in V3.5 to 70.5% in V3.7). Seepage losses from ENP to LEC increase from 406 kac-ft/year in V3.5 to 428 kac-ft/year in V3.7 (22 kac-ft/year increase) as a result of the 75 kac-ft/year increase in S333 flows to NESRS

WATER SUPPLY PERFORMANCE

Lake Okeechobee Service Area

As in the 95BASE the percentage of demand not met for the EAA and the other service areas do not change, as seen in Figures 18 and 19.

Lower East Coast Service Areas

Regional water supply deliveries to LEC Service areas change slightly. Regional water supply deliveries to LECSA1 (Figure 20) decreases from 119 kac-ft/year in V3.5 to 113k ac-ft/year in V3.7 for 31-year simulation. This occurred for the same reasons as discussed for the 95Base.

Regional water supply deliveries to LECSA2 is the same (28 kac-ft/year) in V3.7 as V3.5 for 31-year simulation. A small increase from 59kac-ft/year in V3.5 to 61 kac-ft/year in V3.7 occurs during drought years. This is due to the slight decrease in stages in WCA-2B during drier times as seen in Figure 13 that would translate to a decrease in seepage from WCA-2B to LEC during drier years. The decrease in seepage from V3.5 to V3.7 increases the need for surface water deliveries from the storage areas in V3.7.

Regional water supply deliveries to LECSA3 decrease from 105 kac-ft/year in V3.5 to 99 kac-ft/year in V3.7 for the 31-year simulation. This is due to the increased seepage from ENP to LEC (Figure 21). During drought years the increase in deliveries to LECSA3 is smaller (246 kac-ft/year to 244 kac-ft/year) when the increase in seepage from ENP to LEC from V3.5 to V3.7 is less of a factor. Note that there is a greater dependence on LOK for water supply to LECSA3 in V3.7 than in V3.5,as seen in Figure 20. The percentage of the total surface water deliveries originating from LOK increases from 68%(71/105) in V3.5 to 74%(74/100) in V3.7. This is due to the decrease in stages at 3B-SE in WCA-3B as discussed earlier, which is one of the gage locations used as marsh criteria for minimum flows and levels.

The total number of months of water supply restrictions in the LEC service areas does not change (Figure 22).

FLOWS TO BISCAYNE BAY

Figure 27 shows the comparison of flows to Biscayne Bay. The findings are the following:

1. The flows to Central Bay and Miami River are redistributed. Rating for discharge through G97 (Coral Gables Canal) has been significantly reduced in V3.7. Rating is too high for structure in V3.5. As a result of the reduction of flows through G97, flows to Miami River increase from 121 kac-ft/year in V3.5 to 132 kac-ft/year in V3.7. The 11 kac-ft/year increase
is through S-25B and S-25. Correspondingly the flows to Central Bay decreases about 11 kac-ft/year due to the reduction in flows through G97.

2. The increase in seepage from ENP (22 kac-ft/year) results in about 5 kac-ft/year increase in flow to Central Bay that compensates for some of the

decrease described in 1). The net result seen in Figure 27 is a 5 kac-ft/year decrease (224 to 219) from V3.5 to V3.7 in flows to Central Biscayne Bay. Moreover, the increase in seepage from ENP flows contribute to an increase of flows from 204 kac-ft/year in V3.5 to 207 kac-ft/year in V3.7 to South Biscayne Bay.

GENERAL COMMENTS

The results of the 1995 and 2050 Base simulations using SFWMMV3.7 instead of SFWMMV3.5 change due to: 1) updates in the assumptions to remain consistent with any change in operations over time, as in 95BASE, and/or 2) refinements for sake of improving the simulations, as in the case of both simulations, which is the nature of modeling such a complex system. Overall the results of V3.5 and V3.7 are similar, particularly the 2050 base, which only had some minor refinements. SFWMMV3.7 has more flexibility, particularly in simulating the flows to ENP through the S-12 structures. The full implementation of the WSE operational schedule can be simulated with SFWMMV3.7.

RS/nm
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